Amendments to the Specification:

Please delete paragraphs [0006] to [0010] and insert the following:

[0006] However, with solutions which are known per se, problem arise for the fabrication of gradient layers and equivalent multilayer system, respectively, ~~with such substrates the surfaces of which~~when the surfaces of substrates to be coated are curved at least in areas to further achieve beam shaping properties in addition to the reflection and monochromatization.

[0007] Thus, from R. Dietsch et al. in "PULSED LASER DEPOSITION (PLD) - An Advanced State for Technical Applications", Opt. and Quantum Electronics 27 (1995), page 138S, for example, it is known ~~for~~ in the fabrication of so-called "Göbelspiegel" (Goebel mirrors) to form a nanometer type multilayer system on ~~an~~ correspondingly curved surface of a substrate, in which the respective substrate is moved translatorily with a varied velocity along an axis with respect to a flow source of particles.

[0008] ~~From~~ US ~~S,~~ 5,993, 904 ~~it is known for~~discloses the fabrication of such graded layers ~~to use~~s a mask element which is designed to be fixed with the substrate to be coated. With this mask element, a plurality of channels having a different length is provided, wherein the longitudinal variation of the channels is selected in a continuous manner. According to the length of the channels, an equivalent volume flow rate of particles is allowed to reach through them the substrate surface to be coated, and accordingly, in connection with longer channels a lower layer thickness, and in connection with correspondingly shorter channels a higher layer thickness can be formed.

[0009] However, ~~by the~~ use of a mask element having such channels~~,~~ reduces the achievable coating rate on the surface of the substrate ~~will be reduced~~ since a portion of the flow rate of particles deposits on the mask element and inside the channels.

[0010] Furthermore, with such a solution, the gradient layer formed on the surface of substrates or an appropriate multilayer system cannot avoid residual ripple which negatively affects the optical and X-ray optics properties of the resulting device.

Please delete paragraphs 0012 and 0013 and insert the following:

[0012] Disclosed herein is a device for forming gradient layers on substrates in a vacuum chamber, including a particle source, a mask having discretely located perforations, and a constant thickness disposed between the particle source and the substrate, and a drive means operating on the mask to provide oscillatory movement along at least one axis in a plane with respect to the substrate. A ratio of free cross-sections of the perforations discretely located in the mask and intermediate web surfaces of the mask per unit area is varied over at least one of total surface or on areas of the mask. The distance between the surface of the substrate and the mask differs in size over the total surface of the surface areas.

[0013] Also disclosed herein is a method for forming gradient layers that can be used to prepare various devices such as X-ray optics.

Please delete paragraphs [0014] to [0041] in their entirety

Please delete paragraph [0047] and insert the following:

[0047] Between a target 4 which a particle current is directed from upon the surface of the substrate 3 to be coated, and the surface of the substrate 3 to be coated, a mask 1 to be employed according to the invention is present, which can be moved relative to the substrate 3 by means of a drive~~ not shown as well~~. A respective oscillatory reciprocating motion is intimated with the double arrow which also applies to the perforations formed within the mask I for the illustration in Figure 1.

Please delete paragraphs [0049] and [0050] and insert the following:

[0049] To avoid undesirable layer depositions or the influence of further plasma sources in the vacuum chamber, a shield 5 is present ~~which ensures~~ensuring that the particle current is allowed to selectively pass towards the surface of the substrate 3 to be coated.

[0050] ~~In this example~~By way of example, the distance between the mask 1 having the perforations 2 toward the surface of the substrate 3 is ~~of appr.~~approximately 5 mm.

Please delete paragraph 0058 and insert the following:

[0058] The plate shaped material for the masks I should have a maximum thickness of 1 mm, and the perforations 2 are allowed to be fabricated by means of laser cutting methods or even by conventionall~~y~~ stamping.

After paragraph 0060 please insert paragraphs [0061]- [0070] as follows:

[0061] Disclosed herein is a device for forming gradient layers on substrates in a vacuum chamber. The device generally includes a particle source, a mask having constant thickness and discretely located perforations disposed between the particle source and the substrate and a drive means operating on the mask to provide oscillatory movement along at least one axis in a plane with respect to the substrate. A ratio of free cross-sections of the discretely located perforations in the mask and intermediate web surfaces of the mask per unit area is varied over at least one of total surface or on areas of the mask and/or the distance between the surface of the substrate and the mask differs in size over the total surface of surface areas.

[0062] Features mentioned in the subordinate claims represent advantageous aspects and improvements of the invention. With the solution according to the invention, the surface of a substrate is coated within a vacuum chamber wherein a flow rate of particles utilized for the coating is formed from a particle source and directed upon the surface of the substrate to be coated through a mask having discretely arranged perforations and disposed between the particle source and substrate. Plasma sources, targets and baskets, e.g. are suitable particle sources. On that occasion, the mask is preferably formed as plate shaped, and has a constant thickness, generally.

[0063] The mask and the substrate can be moved relative to each other. This motion is allowed to occur oscillatorily along at least one axis. However, it is also possible during the coating process to perform such oscillatory motions along two axes aligned orthogonally to each other. It is also possible to perform the relative motion in the form of a circular path such that the respective perforations of the mask perform a circular path motion. With such a relative

motion of the mask and substrate, residual ripple effect can be reduced (e.g. with the factor of 10).

[0063] The graded layer thickness can be obtained with the mask to be used according to the invention by means of a respective variation of the ratio of free cross-sections of the perforations being discretely provided in the mask, and the intermediate web surfaces per unit of area. Such graded layer thicknesses can be present over the total surface, on areas of the mask as well to form equivalent gradients of layer thicknesses on the total surface, or merely on areas of the surface to be coated. Gradients of layer thicknesses can also be obtained alone or in addition to the previously described way by means of a corresponding variation of the distance between the surface of the substrate and the mask. Thus, for example, the mask can be obliquely aligned at an inclined angle toward the substrate surface, or an obliquely inclined substrate surface can be used with a mask aligned orthogonally to the respective flow rate of particles. The mask can be curved completely or merely in areas in a concave and convex manner, respectively.

[0064] As a rule, it will be advantageous to form the perforations being discretely arranged within the mask with identical free cross-sections and identical cross-sectional geometries as well. The free cross-sections of the perforations are allowed to be formed in a circular, hexagonal, octagonal or even elliptical manner. With hexagonal or octagonal cross-sectional shapes of the perforations it is possible that unequal edge lengths have been formed in order to obtain elongated free cross-sections of the perforations such as with elliptical shapes as well. In particular, this is favorable if the mask to be used has been aligned at an obliquely inclined angle or with a curved formation with respect to the respective substrate surface. Thus, the respective angle of inclination at the corresponding perforation may be compensated for the passage of the flow rate of particles.

[0065] Frequently, it may be favorable to continuously provide the variation of the ratio of the free cross-sections of the perforations with the intermediate web surfaces per unit of area along an axis. The perforations can be formed in a column and line, arrangement within the mask. In this case it is also suitable for the perforations to be staggered to each other in adjacent lines or columns. It is also possible for this ratio to be varied from the inside radially toward

outwards, for example, originating from the centre or centre of gravity of the surface of the mask. However, the ratio of the free cross-section surfaces and of the intermediate web surfaces per unit of area can also be varied under consideration of a substrate surface being aligned at an obliquely inclined angle or curved, thus considering the different distances between the mask and substrate surface.

[0066] The translatory oscillatory motion between the mask and substrate should preferably be performed in parallel with the alignment of the respective lines and/or columns of perforations. The path traveled between the inversion points during such an oscillatory motion may correspond to the central distance of centers or centers of gravity of the surface of the perforations of a mask. The same dimensioning can also be selected for the diameter of the circular path motions which carry out the individual perforations of the mask.

[0067] The flow rate of particles used for coating can be generated in vacuum with CVD methods or else P2VD methods known per se. Thus, for example, the electro-beam evaporation, the PLD method and ion-supported methods can be employed. Magnetron sputtering has become apparent as suitable to obtain relatively large-area and homogenous coatings, in particular. Successively, multilayer systems can be formed with several sources of particle flow rates in a common vacuum chamber.

[0068] In addition to the relative motion to be employed between the mask and substrate it is also advantageous to additionally move the substrate and mask together with respect to the plasma source and / or a target which in turn can be advantageously obtained through a common rotation about an axis of rotation. For a relative motion of the mask and substrate the most different propulsion concepts can be used. Thus, it is possible to use conventional mechanical drives including gears and without additional gears which can also be combined with the drive for the common motion of the substrate and mask.

[0069] However, in particular for an oscillatory translatory relative motion, it may be advantageous to use at least one piezo actuator which implements the oscillatory motion including a suitable path between the inversion points by means of a lever system, as the case may be.

[0070] With the invention, it is possible to form almost any gradients of layer thickness, and however locally limited gradients of layer thickness in the individual layers or multilayer systems on substrate surfaces. Layer thicknesses within the range of ≥ 0.2 up to 1 μm area are allowed to be implemented. The achievable residual ripple is so small such that interference's with reflections of X-radiation can be avoided. Most differently formed substrate surfaces are allowed to be coated in a graded form wherein variations of layer thickness in different axial alignments can be further obtained.